Serial Number 10/601,598

AMENDMENTS TO CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) An iris extraction method comprising the steps of:

(A) defining two searching regions in a face image, wherein each searching region is a rough position of an eye for locating an iris;

(B) measuring an energy of each pixel within the searching region according to a deformable template match (DTM) algorithm and an energy function, wherein each pixel is a center of a plurality of hypothetical circular templates, each having a hypothetical radius between a maximal radius and a minimal radius, for measuring the energies of the hypothetical circular templates in the face image;

(C) recording the pixels with the same hypothetical radius having energies greater than a threshold as iris candidates, and recording a pixel having the maximal energy from the iris candidates as a first iris candidate;

(D) comparing two of the iris candidates in each searching region for detecting a plurality of associated iris pairs, and recording the lower iris candidate having the maximal energy of the iris pairs as a second iris candidate;

(E) selecting the pixel corresponding to the second iris candidate as a best iris candidate if the distance between the first iris candidate and the second iris candidate is smaller than a predetermined radius; and

(F) designating the best iris candidate having the maximal energy of all best iris candidates with different hypothetical radius as an iris in the face image.

2. (Original) The method as claimed in claim 1, wherein in step (B), the energy function is: $\mathbf{Eg} = \frac{1}{|C|}\oint_C \phi(S)ds$, where C is a periphery of the hypothetical radius, ds is an increment of the periphery along the hypothetical circular template, $\phi(S)$ is a measurement value of a sampling point on the periphery, $|C|$ is the perimeter of the hypothetical circular template.

3. (Original) The method as claimed in claim 2, wherein the measurement value of the sampling point is: $\phi(S) = 1.5\phi_e(S) + \phi_g(S)$, where $\phi_e(S) = w(s)(g_o - g_i)$ is a measurement value of a contrast between an outer intensity and an inner intensity of the periphery of the hypothetical circular template, $\phi_g(S) = 0.1 \times (255 - g_i)$ is a measurement value of the inner dark degrees of the hypothetical circular template, g_i is a gray-scale mean of the image inside a scanning line with the length equal to the hypothetical radius, g_o is a gray-scale mean of the image outside the scanning line, w(s) is a weighting factor of the sampling point, $\phi(S)$ is a weighting summation of $\phi_e(S)$ and $\phi_g(S)$.

4. (Original) The method as claimed in claim 3, wherein in the integration process of the energy function, one sampling point on the periphery is selected every N degrees along the lower half periphery of the hypothetical circular template for calculating $\phi(S)$, where the energy function is an accumulative summation of sampling points, w(s) is a weighting factor of the sampling point, N depends on the number of sampling points.

5. (Original) The method as claimed in claim 4, wherein the summation of all weighting factors of sampling points is 1, and $|C|$ is 1.

6. (Currently Amended) The method as claimed in claim 4, wherein the number of sampling points is[[:]] $((180 \div N) + 1)$.

7. (Original) The method as claimed in claim 1, wherein in step (D), the pixel corresponding to the first iris candidate is selected as the best iris candidate if none of the associated iris pairs is detected.

8. (Original) The method as claimed in claim 1, wherein in step (D), the comparison between two of the iris candidates comprises the steps of:

(D1) obtaining two coordinates of the pixels of two iris candidates;

(D2) detecting a vertical distance between the y-axis coordinates of the iris candidates smaller than a predetermined vertical distance; and

(D3) detecting a horizontal distance between the x-axis coordinates of the iris candidates smaller than a predetermined horizontal distance.

9. (Original) The method as claimed in claim 1, wherein step (E) further comprises the steps of selecting the best iris candidate if the distance between the first iris candidate and the second iris candidate is greater than the predetermined radius;

(E1) detecting whether the energy of the first iris candidate is a predetermined multiple of the energy of the second iris candidate, and if yes, performing step (E2), otherwise designating the second iris candidate as the best iris candidate; and

(E2) designating the first iris candidate as the best iris candidate.